

Profiles and fluctuations in edge and SOL turbulence

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In the scrape off layer (SOL) the time and space averaged profiles of temperature, particle densities, current, and momentum are determined by the intermittent transport generated at the edge shear layer. The distinction between profiles and fluctuations becomes thus arbitrary for situations where the transport is highly intermittent and shows long range correlations. Without this distinction the full range in parameter variability has to be taken into account for simulations, posing extreme demands on the used models.

Numerical investigations and experimental results show how the interplay between radially propagating structures and parallel transport sets up the observed profiles and how intermittency influences edge conditions. The ratio of the radial fluxes is shown to vary significantly in different plasma regimes and could be an important indicator for the observed plasma behavior.

Further filamentary blob structures generate and transport currents in and into the SOL, but also influence the plasma behavior in the edge region.

Finally, the ratio of ion to electron temperature in the SOL is an important measure for the influence of finite Larmor radius effects on the propagation properties of blobs. Newly developed models and their numerical solutions indicate that these effects can lead to an increased self-confinement and radial reach of these structures.

[1] *Steady-state and time-dependent modelling of parallel transport in the scrape-off layer*, Havlickova E.; *Fundamenski W., Naulin V., et al., PLASMA PHYSICS AND CONTROLLED FUSION* **53** 065004, 2011

[2] *Direct Observation of Current in Type-I Edge-Localized-Mode Filaments on the ASDEX Upgrade Tokamak*, Vianello N., Naulin V., Schrittwieser R., et al., *PHYSICAL REVIEW LETTERS* **106** 125002 2011